

A NEW THRIPS-HUNTING *MICROSTIGMUS*  
FROM COSTA RICA  
(HYMENOPTERA: SPHECIDAE, PEMPHREDONINAE)

BY ROBERT W. MATTHEWS  
Department of Entomology  
University of Georgia, Athens, Ga. 30601

In the two years since the discovery (Matthews, 1968a, b) of the first social member of the Sphecidae, *Microstigmus comes* Krombein, which preys on Collembola, I have received a number of additional preserved nests of this genus from the same Costa Rican locality. Two of these, collected by Miss Robin M. Andrews and Dr. Daniel H. Janzen, are quite distinctive and have proven to be those of a new species whose prey is Thysanoptera. O. W. Richards has very graciously consented to describe this new species; I have added notes on the unique prey and distinctive nest structure.

***Microstigmus thripoctenus* O. W. Richards, new species**

*Female.* Pale testaceous; disc of metanotum, propodeum just above petiolar attachment, distal end of petiole, two oval spots on gastral tergite 2 and sometimes a central spot on tergite 1, blackish suffused. Antennal segment 12 sometimes darker. Tips of mandibles piceous. Most of prothorax, tegulae, coxae, trochanters and narrow bases of femora, white. Wings hyaline-iridescent, venation very pale, pterostigma with a large dark distal spot. Eyes evidently green in life. Length ca. 2.5 mm.

Head between eyes nearly as broad as mesoscutum, with eyes clearly broader than distance between outer edges of tegulae. Antennal scape not extending quite halfway to median ocellus; segment 2 clearly longer than 3, about two and a half times as long as broad, 3 almost one and a half times as long as broad, 3-11 very gradually decreasing in length, penultimate segments hardly more than quadrate, 12 a little longer than 2 but considerably thicker. Head smooth and shining, area above antennae with a fine reticulation; clypeus transversely rather convex, ventral margin feebly emarginate and like the outer edge of mandibles with very long pale hairs. Ocelli in a triangle somewhat narrower than equilateral. Oculo-malar space considerably wider than long. Ventral tooth of mandibles long, four times as long as the subtruncate dorsal one, but both

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teeth shorter than in some of the other species. Transverse keel of pronotum very strong but surface otherwise smooth. Mesoscutum shining with some feeble subcoriaceous sculpture in front half, surface with rather close, short stout pale bristles, recurved backwards. Scutellum strongly raised from in front and behind to a sharp transverse keel. Metanotum with a well-marked transverse keel just behind the front margin, a central longitudinal keel with a weaker keel on each side. Propodeum with a number of strong keels, mostly transverse or longitudinal, defining about twelve large rectangular or polygonal areas. Mesopleuron generally smooth but with a system of irregular keels, especially one curving well in front of mid coxa, two irregularly sinuous ones leading upwards from near it, and a keel defining a prepectal area, distinctly below but only feebly above.

*Male.* Rather smaller and paler than the female. Gaster without dark marks. Face from a little way below median ocellus, most of scape, much of side of pronotum, front part of mesopleuron, much of femora, white. Head wider, oculo-malar space longer, but not quite quadrate. Antennae very similar though with one more segment, segment 3 if anything shorter. Distal part of gaster somewhat distorted but tergite 7 apparently not emarginate, with rather long bristles on each side; sternites with much longer apical bristles than female; sternite 7 triangular but with a short, straight apical truncation, a little upcurved, with numerous long bristles beneath.

Holotype ♀, 2♀-1 ♂ paratypes, Costa Rica, Prov. Puntarenas, Osa peninsula, 2½ miles S.W. Rincón, 08°42' N, 83°29' W, 16 Feb., 1969, ex nest (*R. Andrews*). One paratype from nest in same locality 26 Feb. 1968 (*D. H. Janzen*). Holotype and two paratypes deposited in U. S. National Museum, Type No. 70759; other paratype in British Museum.

*Discussion.* There are more species of *Microstigmus* than is usually supposed; as a result several references to the type of the genus, *M. theridii* Ducke, 1907, cannot be accepted without reserve. The British Museum, however, has a female from Ducke's original series from Tefe.

Pate (1937) gives a key to the genera of Pemphredonini including the Neotropical *Microstigmus*. A key to the described species was given by Richards (1932); since then, only *M. comes* Krombein (1967) has been described. The species of *Microstigmus* fall into two groups; those like the present one in which the third antennal segment is less than twice as long as broad and segments

4-11 are hardly longer than quadrate and those more like *M. theridii* in which the third segment is fully twice as long as broad and the remaining segments are also clearly longer than broad.

In the present group three species have been described and I know of no others. These are *M. wagneri* du Buysson, 1907, described from near Tijuca, State of Guanabara, Brazil; *M. guianae* Rohwer, 1923, (= *hingstoni* Richards, 1932) from Guyana (not British Columbia as stated by Rohwer) and *M. myersi* Turner, 1927, from Trinidad. *M. wagneri* has the apical portion of the clypeus considerably produced, a little upturned, and separated from the proximal part by a shallow depression. The mesoscutum is finely rugose. In color it is brownish-black, with head, pronotum, mesoscutum and metanotum reddish, legs testaceous. The nest is said to resemble that of *M. theridii*. *M. guianae* is testaceous with a few brown markings. The mesoscutum is clathrately sculptured. The nest is made of fibre and rotten wood with a pedicel 6 cm long. *M. myersi* is a brown species and the metanotum is hardly convex. The mesoscutum is smooth. The nest is said to resemble that of *M. theridii* but to include some small mud pellets.

#### BIOLOGICAL NOTES

*Nest Construction.* In the same Costa Rican rain forests<sup>1</sup> where *Microstigmus comes* occurs so abundantly, the two nests of *M. thripoctenus* were obtained at heights of 4 and 7 feet above ground. One was found hanging beneath a palm frond tentatively identified as being of the genus *Geonoma*, and the other was suspended from the 12 cm long leaf of an unidentified vine. Both nests hung firmly from the approximate center of the leaf midrib (Fig. 1). Their pedicels, measuring 22 mm (Janzen nest) and 45 mm (Andrews nest) in length, increased in thickness toward the nest proper, from 0.2 mm in diameter at the point of attachment to 0.8-1.0 mm just above the nest entrance.

At first glance, both nest bags appeared somewhat like greyish shriveled pears, but close examination revealed 5 distinct pouch-like lobes about the periphery of the lower half of each. One nest bag proper measured 11 mm long by 10 mm at greatest width (Janzen); the other was 12 mm long by 7 mm at its widest point (Andrews). The nest entrance, situated to one side of the pedicel attachment, was shielded in both nests by a distinctly protuberant hood-like overhang. Such a hood is never present in *M. comes* nests.

<sup>1</sup>See Matthews, 1968b, for a more nearly complete habitat description.

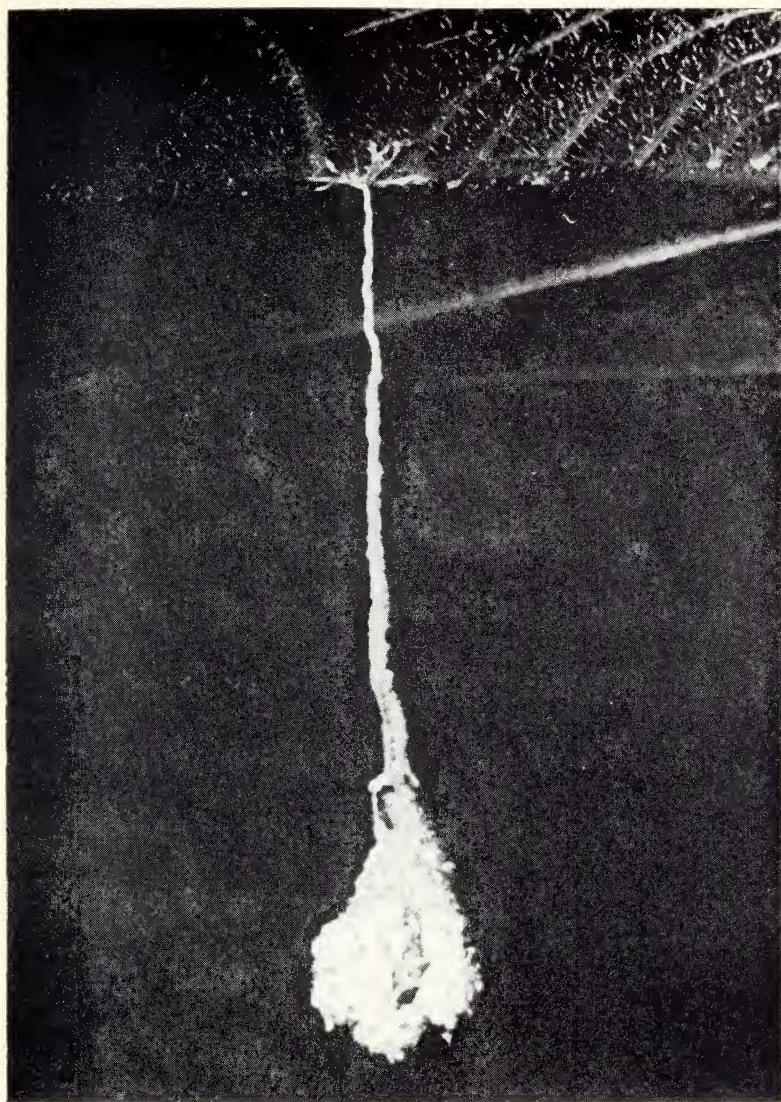


Fig. 1. Nest of *Microstigmus thripoctenus* O. W. Richards. (Photo by Daniel H. Janzen.)

Relatively coarse and irregular chips of punky wood form the basic construction material for the nests. The particles, varying from grey to brown or black and resembling sawdust when dry, are securely bound up in a silken matrix. The entire nest interior, including the cells, is also coated with a silk-like material. Little or no unincorporated nest material remains in the bottom of the nest. In general construction, the nest of *M. thripoctenus* bears a resemblance to that of *M. guianae* which is also made of rotted wood pellets and has a straight, non-spiraled pedicel (see photo in Howes, 1925, p. 276). The nest of another undescribed species from Ecuador is also similar in appearance.

Because the two nests were suspended from different plants, it appears that *M. thripoctenus* does not exhibit the host plant specificity so characteristic of *M. comes*. Neither, as one might suspect from this, does *M. thripoctenus* appear to derive its nest material from the host leaf in the manner of *M. comes*; the leaf undersurface bears no evidence of a scraped area in the vicinity of the nest attachment. And although the nests of both species are coated with a silk-like material, *M. thripoctenus* females have only sparsely scattered hairs on the apical tergite where *M. comes* exhibits its well developed setal brush.

*Cell Contents.* Upon dissection, each nest was found to contain six pocket-like cells, each corresponding to one of the pouch-like lobes (with the extra cell in the center). As with *M. comes*, the cells were mass provisioned, and no two cells were at the same stage of development. Three cells of the Andrews nest contained pupae: one fully pigmented female, one male with cinnamon eyes, and one completely white female. All were oriented with head in the bottom, anus at the cell opening. The remaining three cells of the nest contained a prepupa, a small larva with 171 thrips, and an incompletely provisioned cell containing 58 thrips with no evidence of egg or larva. The Janzen nest, which was less complete, contained one newly emerged adult with freshly expanded wings and, in another cell, a pupal female. A third cell contained a shriveled egg or young larva with 70 thrips. Of the remaining cells, one contained a dozen thrips and two were empty.

The Andrews nest was collected at night when all adults were presumed to be present. It yielded three females and one male. The other nest, collected during the day, contained no adults except for the newly emerged female still in her cell. In the absence of further data, the social status of *M. thripoctenus* must remain un-

certain, although the presence of three females in one nest seems indicative of some degree of social cooperation, which may perhaps be similar to that of *M. comes*.

*Prey.* Use of Thysanoptera as prey has not previously been reported for the genus *Microstigmus*; those species for which prey records are known (*M. comes*, *M. theridii*) use Collembola for provisioning their cells. However, it seems possible that *M. wagneri* and *M. guianae* may also be found to utilize thrips, for they share similar morphological characteristics with *M. thripoctenus*. Other Sphecidae known to prey on thrips include members of the genera *Spilomena* and *Ammoplanus*, pemphredonines which, so far as known, nest in various pre-formed cavities.

All of the over 300 thysanopterans in the Andrews nest were immature individuals, belonging to apparently 4 species (differences may be in stadium rather than taxon). The largest individual measured nearly 1 mm long, but most were about 0.5 mm in length. With but two exceptions, the 82 thrips from the Janzen nest were also immatures, belonging to 3 or more apparent species. Kellie O'Neill of the U.S. National Museum determined the Janzen nest prey as species of Thripidae and identified the two adult females as *Leucothrips* sp. and *Bradinothrips* n. sp. In her letter, she states that the prey "belong to groups of minute, pale, solitary leaf feeders that jump readily and are difficult for humans to capture." Indeed, she added, *Bradinothrips* was previously known only from a unique individual collected in British Guiana.

Within the *M. thripoctenus* nests, the prey appeared to be piled loosely in the cell bottoms rather than packed in compact masses like the Collembola of *M. comes*. Since several specimens were dislodged from their cells during shipment, exact prey counts per cell were not possible. However, the 171 individuals that remained in one cell of the Andrews nest seems an extraordinary number; by contrast, the most Collembola present in any of 22 *M. comes* cells examined was 58.

#### SUMMARY

The new sphecid wasp, *Microstigmus thripoctenus* O. W. Richards, is described and its relationships to other species of *Microstigmus* discussed. Its 11-12 mm long bag-like nest is suspended on a straight pedicel from the underside of leaves in the Costa Rican rain forest. Constructed of punky wood chips bound together in a silken matrix, the nest has a hood-like overhang above

the entrance and a bottom half with lobes roughly corresponding to the cells within. The six cells are mass provisioned with Thysanoptera (*Leucothrips* and *Bradinothrips*), a new prey record for the genus, with as many as 171 individuals found in one cell. One male and 3 female wasps were present in one nest collected at night.

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